

**DECISION NOTICE
AND
FINDING OF NO SIGNIFICANT IMPACT**

**USDA Forest Service
Monongahela National Forest
July 2011**

**LOWER WILLIAMS TERRESTRIAL LIMING PROJECT
Gauley Ranger District
Webster County, West Virginia**

INTRODUCTION

This Decision Notice and Finding of No Significant Impact (FONSI) documents my decision regarding activities analyzed in the Lower Williams Terrestrial Liming Environmental Assessment (EA). It also provides the location of the project area, the activities selected for implementation, reasons for my decision, the public involvement process used, alternatives considered, findings required by laws and regulations, information regarding opportunities to appeal, and persons to contact about the decision and its supporting documentation.

BACKGROUND

The purpose of this project is to use terrestrial liming to move toward the restoration of base cations lost from the soil. This loss of base cations associated with soil nutrients such as calcium is due to long-term acid deposition in the project area and the base-poor status of soils forming from the base-poor geologic Pottsville Formation, which is made up of the Kanawha and New River geologic groups.

Terrestrial liming will act to increase base cations in the soil profile, which will in turn help to restore soil quality by elevating base saturation and the cation exchange capacity of affected soils in the treatment areas. Implementation of this project is consistent with, and responds to, direction in the 2006 Monongahela National Forest Land and Resource Management Plan (Forest Plan). The key Forest Plan goal that provides direction for this project is SW01 on page II-9:

“Maintain, restore, or improve soil quality, productivity, and function. Manage soil disturbances from management activities such that they do not result in long-term loss of inherent soil quality and function.”

The design of the project will help restore soil quality, productivity, and function while creating little new soil disturbance in the project area (see below map). Terrestrial liming will restore calcium and base cations to the soil to help restore the desired soil chemistry and quality in the area, which will enhance site productivity and thereby support vegetation growth and vigor over the long term.

The EA documents the analysis and discloses the environmental effects of three alternatives: the No Action (Alternative 1), the Proposed Action (Alternative 2), and the Modified Proposed Action (Alternative 3). It is available for review at our [website](#) and at the Gauley Ranger Station in Richwood, WV.



I am the responsible official for the Lower Williams Terrestrial Liming Project analysis and am authorized to make this decision. Based on my review of the Lower Williams Terrestrial Liming EA, supporting information in the project file, and public comments received throughout the process, it is my decision to implement Alternative 3 (Modified Proposed Action).

Limestone sands will be applied, at 3-5 tons per acre, to an estimated 797 acres. The method of lime application will either occur via a ground-based soil-disturbing method (such as adapted skidder system or other piece of mechanical equipment) described in this project as MODERATE disturbance, or via low-impact soil-disturbing methods such as hand application, or aerial application (i.e., helicopter) described in this project as LOW disturbance. See Figure 2 for location of the treatment application units and Table 1 for units where application would occur.

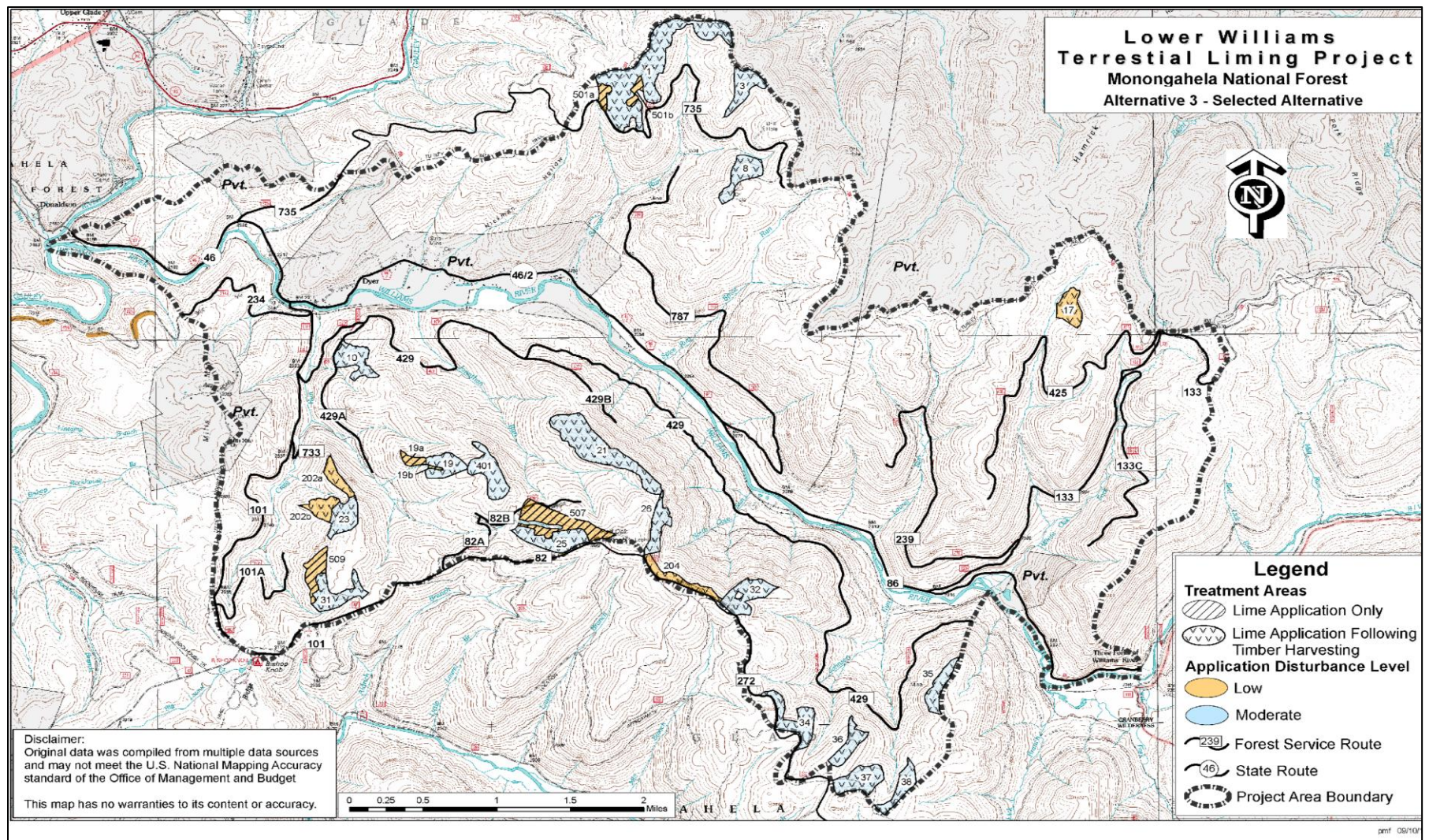


Figure 2 Alternative 3 Terrestrial Liming Treatment Areas

Table 1 Lime Application Units for Alternative 3

UNIT ID	ESTIMATED APPLICATION LEVEL	ACRES
1	MODERATE	132
3	MODERATE	25
8	MODERATE	28
10	MODERATE	29
17	LOW	22
19	MODERATE	24
19a	LOW	7
19b	LOW	1
21	MODERATE	79
23	MODERATE	26
25	MODERATE	36
26	MODERATE	23
31	MODERATE	32
32	MODERATE	34
34	MODERATE	34
35	MODERATE	21
36	MODERATE	21
37	MODERATE	32
38	MODERATE	21
204	LOW	20
401	MODERATE	35
507	LOW	49
509	LOW	20
202a	LOW	14
202b	LOW	17
501a	LOW	8
501b	LOW	7
ESTIMATED TOTAL ACRES		797

This decision includes the design features, mitigation measures, and monitoring from pages 13-17 of the EA, and they are also found at the end of this document.

REASONS FOR DECISION

Alternative 3 was developed in response to multiple issues: a focus on high-risk areas for base cation loss, as well as the presence of nodding pogonia, green salamander, or NNIS in the project area, and the impacts on black cherry and other species that may have a preference for acid soils. I have chosen to implement Alternative 3 because, when compared to the other alternatives, Alternative 3 best meets management objectives while protecting area resources (Forest Plan, p. II-9). More specifically, my rationale for selecting Alternative 3 includes the following:

1. It is anticipated that limed units will see an increase in calcium in the upper most soil horizons. Over time, it is expected that the calcium will work its way into the ecosystem and be cycled to other important resources such as understory vegetative biomass, wildlife (snails and birds), microbial populations, and eventually the overstory biomass (EA p. 22-23).
2. Beneficial effects of adding lime to forest acid soils include potential decreases in Aluminum (Al^{+3}) and hydrogen anion (H^{+}) toxicity, and decreases in aluminum (Al) and manganese (Mn) solubility. There is the potential for an increase of organic carbon and nitrogen (N) leaching from the soil due to increased microbial activity (EA p. 22).
3. Soil structure will be improved, promoting soil quality related to physical properties such as pore space, intensity, and infiltration (EA p. 22).

4. Lime will not be applied to any known population of nodding pogonia on the Forest. Therefore, the potential for affecting nodding pogonia is low, with such effects occurring only if undiscovered populations exist in the liming units (EA p. 50).
5. Potential adverse effects to black cherry will be minimized, because of the reduced lime treatment acreage, when compared to Alternative 2 (EA p. 18).
6. Potential impacts to green salamanders will be less than Alternative 2 due to fewer acres treated in or near suitable salamander habitat (EA p.18).
7. A variety of wildlife species, including shrub-nesting birds, may benefit from an increase in understory vegetation as a result of the temporary increase in pH. This vegetation would provide increased structural diversity that could attract songbirds such as Kentucky warblers and nesting wild turkeys (EA p. 31).
8. Alternative 3 will have less potential to establish or spread invasive plant species than Alternative 2 because of the overall reduction of treatment acreage (EA p.18).
9. A higher percentage of Alternative 3 treatment acres are sensitive to acid deposition than acreage proposed under Alternative 2 (EA p.18).

I believe Alternative 3 is consistent with the resource goals, objectives, standards, and guidelines of the Forest Plan (p. II-9) and meets Forest Plan Goal SW01 to:

“Maintain, restore, or improve soil quality, productivity, and function. Manage soil disturbances from management activities such that they do not result in long-term loss of inherent soil quality and function.”

Overall, I feel that the potential benefits from implementing Alternative 3 outweigh the low potential risks to the environment.

PUBLIC INVOLVEMENT AND ISSUES

Chapter 1 (p. 8) of the Lower Williams Terrestrial Liming Project EA describes the process used to solicit and employ internal and public comments. Opportunities to comment were provided throughout the analysis process, including after development of the proposed action, and following identification of the issues and alternative development. The following is a summary of public involvement and issues.

1. This project was first announced in the Schedule of Proposed Actions (SOPA) in October 2007 and has remained in this quarterly publication since that date. The SOPA is posted on the Forest website and mailed to roughly 140 people, organizations, and agencies that are interested in Forest projects.
2. The District Ranger sent a scoping letter, dated July 1, 2007, to interested members of the public, various government agencies, adjacent landowners, environmental organizations, and the timber industry. Fourteen scoping packages were mailed. The scoping letter and information packet was also posted on the Forest website. Public comments received during the scoping period were reviewed for relevant and non-relevant issues. Comments were generally supportive of the proposed action and no major issues were identified through the public scoping process that would result in the development of an alternative to the proposed action.
3. A legal notice was published in the *Nicholas Chronicle* (newspaper of record) on November 18, 2010, announcing the formal 30-day comment period for this project, pursuant to the Forest Service Notice, Comment, and Appeal Procedures, Section 36 CFR 215.5. The formal 30-day comment period for this project was November 18, 2010 through December 17, 2010. A comment letter and the draft EA were also sent to 19 interested parties. The draft EA was also available on the Forest website throughout the comment period.

Four comments were received during the 30-day comment period. One comment provided constructive suggestions and assistance in implementation of the project. One was generally supportive of the project. Two comments were unsupportive of the action alternatives. One commenter did not want lime applied to spruce populations. Spruce makes up a very small percentage of the treatment units. I feel that clumps of spruce may be avoided where it is technologically feasible, likely where lime is hand applied in the LOW disturbance application units. This comment generated a new design feature for vegetation (page 14 of this document, and EA p. 16). One commenter did not want lime applied to black cherry. One of the reasons I have decided to implement Alternative 3 is because it minimizes potential adverse effects to black cherry, but still meets the project's purpose and need, and Forest Plan direction.

Issue 1: Presence of nodding pogonia in units to be treated with lime

Nodding pogonia (*Triphora trianthophora*), a Regional Forester's Sensitive Species, is known to occur throughout one of the units proposed for liming. The population in the proposed liming unit under Alternative 2, is the largest of only five known populations of this species on the Forest. No scientific information is available regarding the possible effects of terrestrial liming on this plant. If liming is detrimental, the proposed action could have a major impact on the viability of this species within the project area and on the Forest. This issue was addressed in the selected alternative by eliminating treatment within the unit that has nodding pogonia.

Issue 2: Potential effects to vegetation from liming, particularly to black cherry

Lime application as proposed, 3-5 tons per acre, may have both positive and negative impacts to establishment of certain tree species in regenerating stands, and to tree growth and survival in all stands treated. A study conducted in Potter County, Pennsylvania of limestone application at 10 tons per acre, showed a variety of vegetation responses, from slowed growth and increased mortality in black cherry, to no response in American beech, to improved health and growth in sugar maple (Long et al. 1997, 1999). The degree of impact in this project as proposed is likely to be less than in a study with a higher amount of lime application. This issue was addressed in the selected alternative by reducing the overall treatment acres compared to the proposed action, and thus reducing the potential for impacts to black cherry within the project area.

Issue 3: Presence of green salamander populations in units to be treated with lime.

The green salamander (*Aneides aeneus*), a Regional Forester Sensitive Species, has been observed in several rocky outcrops and adjacent forested habitats across the project area, with a possibility that more may be present in other areas scheduled for liming. Little information is available regarding either the pH tolerance limits of the green salamander or the potential effects of terrestrial liming on its invertebrate prey species. Information on the current abundance and distribution of the species across the Forest is also lacking. If liming does have a detrimental effect on this species and application is widespread, local sub-populations could be extirpated, potentially resulting in a negative effect on the viability of the broader population. This issue was addressed in the selected alternative by reducing the overall treatment acres compared to the proposed action, and thus reducing the potential for impacts to green salamander within the project area. In addition, design features and mitigation measures were added to reduce the potential for impacts to green salamanders within all treatment units (EA p. 12).

Issue 4: Increased potential for NNIS to spread throughout units treated with lime

Several non-native invasive species (NNIS) of plants occur in the vicinity of the units proposed for liming. Garlic mustard (*Alliaria petiolata*) and Japanese stiltgrass (*Microstegium vimineum*), which spread very aggressively and are capable of invading closed-canopied forests, are of particular

concern. Most NNIS, including garlic mustard and Japanese stiltgrass, are more aggressive on nutrient rich sites than on nutrient poor sites. Therefore, the action alternatives could facilitate the spread of NNIS. This issue was addressed in the selected alternative by reducing the overall treatment acres compared to the proposed action, and thus reducing the potential for establishing or spreading NNIS within the project area. In addition, design features and mitigation measures were added to reduce the potential for NNIS establishment and spread within all treatment units (EA p. 13-15).

Issue 5: Lime treatments should focus on high-risk areas for base cation loss

Forest-wide monitoring has shown that soils that form on ridges and on benches in areas rated as high risk are potentially the most susceptible to long-term nutrient depletion. Existing reservoirs of base cations on these landforms appear to be very low when compared to other soils on the Forest and even compared to soils that form in coves and backslopes within the same project area (USDA 2009, Appendix A, Acid Deposition Analysis). These landforms should receive the highest priority in receiving lime because of the pre-monitoring data and immediate concern for base cation restoration. This issue was addressed in the selected alternative by selecting treatment units that have a higher percentage of high-risk land forms susceptible to long-term nutrient depletion.

ALTERNATIVES CONSIDERED**Alternatives Considered but Not Analyzed in Detail**

There were no alternatives suggested for consideration by scoping comments or other external sources.

Alternatives Analyzed in Detail

Three alternatives were considered and analyzed in detail, Alternative 1 (No Action), Alternative 2 (Proposed Action), and Alternative 3 (Modified Proposed Action). Alternative 3 is the Selected Alternative described above in this Decision Notice and in Chapter 2 of the EA. Alternative 1 (No Action) and Alternative 2 (Proposed Action) are described below, along with the reasons I did not select them for implementation.

Alternative 1 – No Action

This alternative proposes no action, and provides a baseline against which to describe the environmental effects (Chapter 3) of the action alternatives (2 and 3). Under Alternative 1, current management plans would continue to guide management of the Lower Williams River Watershed. No new soil liming restoration activities would occur to improve existing conditions and contribute to Forest Plan goals and desired conditions.

Ongoing management activities such as vegetation management, road maintenance, and recreation would continue through current management direction or other management decisions in the future.

I did not select this alternative because it would not meet the purpose and need for the project nor move existing conditions toward Forest Plan goals and desired conditions.

Alternative 2 – Proposed Action

Limestone sands would be applied, at 3-5 tons per acre, to an estimated 2,406 acres. The proposed action is designed to help restore soil quality in relationship to base cation status in site-specific areas of the Lower Williams River Watershed by adding limestone sands to various stands within the project area. The long-term goal of terrestrial liming is to address historic base cation

losses in the soil profile that are due to atmospheric acid deposition. The method of lime application would either occur via a ground-based soil-disturbing method (such as adapted skidder system or other piece of mechanical equipment) described in this project as MODERATE disturbance, or via low-impact soil-disturbing methods such as hand application, or aerial application (i.e., helicopter) described in this project as LOW disturbance. See EA p.12, Table 2-1, for units where application would occur and Figure A-1 in Appendix A for location of the treatment application units.

I did not select this alternative because, in comparison to Alternative 3 (Selected Alternative). Alternative 2 would not address the issues. Alternative 2 would apply lime to the largest known population of nodding pogonia, a Regional Forester's Sensitive Species, on the Forest. The effects of liming on nodding pogonia are unknown. Because of this, under a worst-case scenario, Alternative 2 could lead to the extirpation of a large population that is critical for maintaining long-term viability on the Forest. Therefore, Alternative 2 may result in loss of viability for nodding pogonia. Alternative 2 proposes 2,406 acres for terrestrial liming, versus 797 in Alternative 3. The greater acreage proposed under Alternative 2 would be expected to result in greater potential adverse effects to black cherry and green salamander, and a higher risk for the establishment and spread of non-native invasive species.

FOREST PLAN CONSISTENCY AND BEST AVAILABLE SCIENCE

The National Forest Management Act (NFMA) implementing regulations require that projects designed to implement land management plans and plan amendments...must be developed considering the best available science in accordance with CFR 219.35(a)...and must be consistent with the provisions with the governing plan.

As noted in the "Reasons for Decision" section above, I have found Alternative 3 to be consistent with the 2006 Monongahela National Forest Land and Resource Management Plan, specifically Forest-wide management direction for soil resources found on page II-9.

I also believe that this project used the best available science in analyzing and disclosing potential effects. The need to employ the best science is not new, as Agency decisions have always required a sound technical basis. What constitutes best available science can vary over time and across scientific disciplines. My conclusion that this project analysis used the best available science is based on my review of the EA and project file that shows a thorough assessment of relevant scientific information, a consideration of responsible views, and the acknowledgement of incomplete or unavailable information, scientific uncertainty, and risk. Therefore, I believe that my decision meets these NFMA requirements.

FINDING OF NO SIGNIFICANT IMPACT

Based on the EA, I have determined that the actions associated with terrestrial liming activities on 797 acres of National Forest System lands within Webster County in West Virginia, is not a major federal action significantly affecting the quality of the human environment. Therefore, an Environmental Impact Statement is not needed. My determination was made considering the following factors:

Context

The physical and biological effects of this action are limited to the treatment areas where the liming activities will be implemented. This area represents only 0.0008 percent of the Monongahela NF.

Intensity/Severity

1. **Impacts that may be both beneficial and adverse.** Both beneficial and adverse impacts of this project have been considered. These actions will not cause a significant effect on the quality of the human environment (EA, Chapter 3, Resource Analyses) because (1) design features identified in the EA (p. 13-17) will be implemented; (2) the physical and biological effects are limited to the project area; and (3) based on identified issues, there are no known significant irreversible or irretrievable commitment of resources (EA, Chapter 3, Resource Analyses).
2. **Public health and safety.** Public health and safety will not be significantly affected by the selected alternative, which involves the application of lime on federal lands that are remote from human habitation and that are infrequently visited by the public. As stated above, all Forest-wide standards and guidelines (including those related to public safety) will be followed.
3. **Unique characteristics of the geographic area.** There will be no significant impact on unique characteristics of the geographic area. Historic and cultural resources are discussed below and in the EA (p. 10) and Project File (K-1). There are no coastal zones areas, floodplains, prime farmlands, research natural areas, state or national parks, conservation areas, or other ecologically critical areas adjacent to or present in any treatment units.
4. **The degree to which the effects on the quality of the human environment are likely to be highly controversial.** Controversy in this context refers to cases where there is substantial dispute as to the size, nature, or effect of Federal action, rather than opposition to its adoption. None of the issues within the scope of this analysis are believed to be highly controversial within the scientific community.
5. **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.** The liming activities in my decision are a common practice to reduce acidity in soils for vegetable crops and in water to improve aquatic habitat. Liming on soils and water has shown little to no degree of adverse effects on the human environment. Possible effects on the human environment are not highly uncertain nor do they involve unique or unknown risks.
6. **The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.** Terrestrial liming activities, as authorized by my decision, have not been implemented on the Forest to this scale before. However, liming is a common practice both on the Forest and in the State to address acidity in soils and waters. This action does not set a precedent for future actions. As a part of adaptive management, this project moves to address concerns due to the project area's combination of acid sensitive geologies and base cation losses due to atmospheric acid by restoring base cations through terrestrial liming (EA p.2).

No other actions are expected in the project area or the watershed that will cause selected projects to establish a precedent for future actions with significant effects (see Cumulative Effects sections throughout Chapter 3 of the EA). Alternative 3 liming activities are within the scope of the Forest Plan (See Forest Plan Consistency sections throughout Chapter 3 of the EA).

7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.** The “Scope of Analysis” sections throughout Chapter 3 of the EA identify the area and rationale used to assess the cumulative effects of various resources. The “Cumulative Effects” sections throughout Chapter 3 explain why no alternatives or activities analyzed would have cumulatively significant impacts.
8. **The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historic resources.** Terrestrial liming application, as authorized in this decision, is anticipated to have no effect on heritage resources in the project area (Project File K-1).
9. **The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.** As supported in the Lower Williams Terrestrial Liming Biological Assessment (Project File Q-1), implementing Alternative 3 will have no effect on Indiana bat or its designated habitat. Alternative 3 will have no effect on existing populations of Virginia spirea or potential habitat. Shale barren rockcress has no potential to occur in the project area; therefore, Alternative 3 will have no effect on shale barren rockcress. Alternative 3 may affect, but is not likely to adversely affect running buffalo clover. Given the very low likelihood of occurrence of small whorled pogonia in the project area, Alternative 3 may affect, but is not likely to adversely affect small whorled pogonia.

If any federally listed threatened or endangered species are found during project design or implementation, activities within that area will cease until additional consultation with USFWS has been concluded.

Mitigation attached to this decision will be followed to help reduce the potential adverse effects to threatened or endangered species.

10. **Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.** No Federal, State, or local laws (e.g. the Clean Air Act, Clean Water Act, Endangered Species Act, various heritage resource laws, Multiple Use Sustained Yield Act, Wild and Scenic Rivers Act, WV Best Management Practices, etc.) will be violated (EA, Chapter 3 and information in the Project File).

FINDINGS REQUIRED BY OTHER LAWS AND REGULATIONS

It is my finding that the actions described in this decision comply with the requirements of the National Environmental Policy Act (NEPA), the Endangered Species Act of 1972, the National Forest Management Act (NFMA) of 1976, and the NFMA implementation regulations in 36 Code of Federal Regulations Section 219.

Forest Plan Consistency - Management activities are to be consistent with the Forest Plan [16 U.S.C. 1604 (i)]. The Forest Plan guides management activities [36 CFR 219.1(b)]. Page 3 of the EA lists the pertinent Forest Plan management area direction for the project area.

ADMINISTRATIVE REVIEW AND APPEAL OPPORTUNITY

This decision is subject to appeal pursuant to regulations at 36 CFR 215. An appeal may be filed by those who provided comment or otherwise expressed interest in the proposed action during the 30-day comment period. To appeal this decision, a written Notice of Appeal must be postmarked or received within 45 calendar days of when the Legal Notice is published in the *Nicholas Chronicle*, which is the newspaper of record for this decision. However, when the 45-day filing period would end on a Saturday, Sunday, or Federal holiday, then filing time is extended to the end of the next Federal working day. The date of the publication of the Legal Notice is the exclusive means for calculating the time to file an appeal. Those wishing to file an appeal should not rely upon dates provided by any other source. Contents of the Notice of Appeal must meet the requirements of 36 CFR 215.14.

Send the Notice of Appeal to USDA, Forest Service, Monongahela National Forest, ATTN: Clyde Thompson, Appeals Deciding Officer, 200 Sycamore Street, Elkins, WV 26241. The Notice of Appeal may alternately be faxed to: Attn: Appeals Deciding Officer, (304) 637-0582, mailed electronically (in a format, pdf, txt, rft, or document compatible with Microsoft Office applications) to comments-eastern-monongahela-gauley@fs.fed.us, or hand delivered between the hours of 7:30 a.m. – 4:00 p.m., Monday through Friday.

IMPLEMENTATION DATE

This decision may be implemented on, but not before, five business days following publication in *The Nicholas Chronicle*. If an appeal is received, a stay may be requested by the appellant.

RESPONSIBLE OFFICIAL AND CONTACT PERSON

For more information concerning this decision, contact Sarah Hankens at voice/TTY at 304-799-4334 or by writing to the Gauley District Office, 923 North Fork Cherry Road, Richwood WV, 26261. A copy of the Lower Williams Terrestrial Liming Project EA can be obtained from the Monongahela National Forest website at www.fs.fed.us/r9/mnf/ under “Land & Resource Management” and “Projects”, by emailing comments-eastern-monongahela@fs.fed.us, writing or calling Sarah Hankens at phone number above, or by contacting the front desk at Gauley District Office, at 304-846-2122 or the above address. Records that support the conclusions of the EA and that were used to make this decision are available for review at the Gauley Ranger Office from 8:00 AM to 4:30 PM Monday through Friday.

/s/ Jared C. Johnson

July 22, 2011

Jared C. Johnson
District Ranger

Date

USDA Nondiscrimination Statement

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

DESIGN FEATURES AND MITIGATION MEASURES

The following design features and mitigation measures will be incorporated into approved activities, in addition to applicable Forest Plan direction.

General measures:

- Spread liming amendment evenly across soil surface.
- Apply lime at 3-5 tons per acre.
- Avoid creating new areas of soil disturbance.
- Use only approved amendments. Obtain a chemical analysis prior to application and adjust liming rate accordingly.
- Application of caustic forms of lime—such as burnt lime, calcium hydroxide, liquid lime, agricultural lime, and other forms that react in a caustic manner—is not permitted.

Wildlife: Indiana Bat

- No trees including snags over 5" dbh will be cut. Trees with loose, sloughing or deep fissured bark characteristics (e.g. shagbark hickories) will not be disturbed.

Wildlife: Other Threatened, Endangered, and Sensitive Species

- Forest floor-disturbing activities (vehicle movement, liming, etc.) will avoid rock outcroppings, and activities within 150 feet of outcroppings will be limited to foot travel only.
- A monitoring protocol will be implemented to detect changes in the salamander population and diversity within the project area.
- If any other federally listed or Forest Service sensitive species are encountered during project implementation, the district biologist will be notified immediately so the appropriate management actions can be implemented.
- Forest floor-disturbing activities (vehicle movement, liming, etc.) will be prohibited within 150 feet of known green salamander locations.

Non-native Invasive Plants

- Before entering National Forest land, all vehicles and equipment to be used off of maintained system roads, including, but not limited to, skidders, bulldozers, spray vehicles, tractors, plows, disks, etc. must be free of all soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Equipment and vehicles that are used in infested areas must be cleaned to the same standard before being moved to any other area of National Forest land. Vehicle and equipment cleaning should be conducted in a manner that 1) does not spread invasive plants to uninfested areas, and 2) does not contaminate soil and water with oil, grease, or other contaminants.
- Follow-up monitoring and control of garlic mustard is needed where lime is applied by low disturbance methods within 40 meters of existing infestations. See specific locations and control methods below. All moderate disturbance areas that are near garlic mustard infestations are already subject to follow-up monitoring and control as part of the Lower Williams timber project. If new or expanded garlic mustard infestations occur, follow-up control and monitoring will be necessary on an annual basis until infested areas are shown to be free of garlic mustard for three consecutive growing seasons, or until the Responsible Official determines that effective control is not practical.

Table 2 Areas Subject to Follow-up Control and Monitoring of Garlic Mustard

Location	Alt 3 acres
Low disturbance areas adjacent to cc unit 2 within 40 m of FR 75	1.6
Low disturbance areas north of cc unit 25 within 40 m of FR 82B	3.8
Low disturbance areas in helicopter thin unit 4 within 40 m of FR 82	8.8
Total	14.2

- Garlic mustard will be controlled by foliar application of glyphosate or triclopyr (2-3%) at an application rate of up to 4 lbs a.e./ac for glyphosate or 3 lbs a.e./ac for triclopyr. During each year that control efforts are conducted, application will occur once in early spring between mid-March and mid-May. Because garlic mustard is a biennial plant that stays green all year, application at this time of year will maximize control by killing second year plants, as well as many newly sprouted first year plants. Also, because glyphosate is non-selective and will harm any plant that is green at the time of application, this timing will minimize effects on many non-target plants that have not yet broken winter dormancy. Using triclopyr would reduce non-target impacts further because triclopyr is broadleaf-specific. An aquatic formulation of glyphosate or triclopyr will be used within 100 feet of intermittent and perennial streams. It is anticipated that all applications will be made using a backpack sprayer or similar hand-carried device. Control of garlic mustard on the roadsides, which may use vehicle-mounted equipment, is covered under design criteria for the Lower Williams timber project.
- At the discretion of the Responsible Official, hand-pulling could be substituted for herbicide to control very small spot infestations or infestations in sensitive locations. If hand-pulling is used, it would occur between mid-April and mid-June of each treatment year.

Vegetation

- Lime will not be applied to aggregate groups of spruce trees, when possible, in LOW application method units.

Monitoring Plan

Soil Resource

Soil quality monitoring would be part of the project decision in order to determine the effectiveness of soil liming associated with this project. Monitoring involves the orderly collection, analysis, and interpretation of data from the same locations over time. Several soil samples should be pulled from 3 units post application to be analyzed for CaCO_3 content to ensure that the rate recommended (3 to 5 tons/acre) was actually applied. The selected units for post implementation monitoring should include units that were pre-monitored in 2006, 2007, and 2008. Immediately after collection, samples can be air dried and stored until analyses can be completed. Repeated soil sampling in years 1 and 3 should occur, and soil chemical analyses for base cations, acidity, base saturation, pH, and calcium/aluminum ratios should be run on those samples as funding allows, comparing results with baseline data taken prior to implementation.

Archive samples should be kept for this project until the Forest Soil Scientist advises the decision maker that long-term monitoring needs have been met. These archive samples can be stored on Forest or with a cooperator as long as there is a record maintained at the Supervisor's Office with the Forest Soil Scientist official files as to where those samples are located. Data can be compared to other sites within the watershed to see how effective the liming treatment was in restoring base cation losses. Optimally, soils should again be monitored ten years after application. This data can then be compared to other studies that have looked at liming effects ten years after application. At this point a review of the science, practices in the forestry industry, and sampling techniques can dictate how much sampling would be needed if any to make a determination of whether the proposed restoration practice was successful in the long-term.

Wildlife: Sensitive Species

A monitoring protocol has been developed to detect changes in the salamander population and diversity within the project area (See Project File P-3). Cover board grids have been established in multiple locations in the project area based on treatment types (harvest only, liming only, combination of harvest and liming, and control), forest cover type, slope (direction and gradient), and elevation. The protocol states that board checks should continue for a minimum of 2 years after treatment, but longer if effects are apparent.

Non-Native Invasive Plants: Garlic Mustard

See Table 2 Areas Subject to Follow-up Control and Monitoring of Garlic Mustard and its preceding paragraph, above, for monitoring guidelines and locations.

Native Plants

It is important to understand the effects of liming on project area understory vegetation before applying lime as a mitigation for acid deposition across the broader landscape with similar vegetation. Therefore, monitoring is needed to document any changes in species composition that occur due to liming.

To properly attribute any observed changes to the liming, monitoring needs to include, at a minimum, one treatment stand and one control stand for each combination of harvest type with liming (see Table 3 Stand Pairings for Monitoring Effects of Terrestrial Lime Application on Understory Vegetation in the Lower Williams Terrestrial Liming Project Area). Treatment/control pairs should be as similar as possible in terms of landform, geologic formation, elevation, aspect, exposure, forest type, and other physical and biological factors that influence plant community composition. Sampling needs to occur at least once prior to liming (preferably more than once), and should occur annually for three growing seasons after liming and every third year thereafter

until species composition and abundance stabilizes. Within each stand, understory vegetation plots will be sampled for percent cover and/or stem counts of herbaceous vegetation and shrubs/saplings/vines. Precise numbers and layout of plots can be determined at implementation of monitoring and is likely to depend at least partly on available funding and manpower. Ten plots per stand are considered the minimum, but more plots are better. Plot sampling should be supplemented by walk-through surveys of each stand to compile a complete understory plant species list. Previously completed walk-through clearance surveys that were conducted for the timber project may be used for the pre-liming survey if coverage was sufficient.

Table 3 Stand Pairings for Monitoring Effects of Terrestrial Lime Application on Understory Vegetation in the Lower Williams Terrestrial Liming Project Area

Control	Treatment
No harvest, no lime	No harvest, lime applied
Thinning harvest, no lime	Thinning harvest, lime applied
Clearcut harvest, no lime	Clearcut harvest, lime applied

Vegetation Resource

Normal monitoring of regeneration harvests includes first and third year stocking surveys that record the numbers, diversity and height of tree and shrub regeneration, and other factors. Pre-treatment monitoring of vegetation-related conditions in the proposed treatment areas has occurred as a result of interest and cooperation from researchers. This is expected to continue and result in post-treatment monitoring of effects on a variety of trees after liming. Any post-treatment effects on growth and health that might be attributable to the limestone application may be determined by such research on site. However, there are many factors that contribute to regeneration success or failure, and therefore it may be difficult to isolate the effects of any single factor.